

REMARKS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested.

In the Office Action of December 19, 2000, the title of the invention was objected to as being non-descriptive. By the present Amendment, the title has been amended to more accurately describe the present invention. Also, the Office Action objected to informalities on page 6, line 9 of the specification, stating that "side wall 44" should be --side wall 40--. By the present Amendment, the specification has been amended on page 6, line 9 to correctly identify the side wall as reference number 40.

In the Office Action of December 19, 2000, the drawings were objected to as not showing every feature of the claims. Specifically, the drawings were objected to as not showing the "second output means" as recited in claim 22. Claim 22 has been cancelled by the present Amendment and there are no pending claims that recite a second output means.

In the Office Action of December 19, 2000, claims 1-17 and 22 were rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or which it is most nearly connected, to make and/or use the invention. Claim 22 has been cancelled by the present Amendment.

With respect to claims 1-17, the Office Action stated that the specification does not describe how one skilled in the art would make the apparatus such that the first portion

of the closure member is sheared from the second portion of the closure member. The Office Action stated that it is not clear why the closure member would not rupture in the center, or split from a single point outward. The Office Action also stated that it is not described how the rupture disk will only shear off the domed portion and not break at some other point.

The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. *In re Buchner* (See MPEP 2164.01). A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. (emphasis added, see MPEP 2164.04). It is incumbent on the Patent Office, whenever a rejection on this basis is made, to explain *why* it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. *In re Marzocchi* (emphasis in original, see MPEP 2164.04). In making this explanation, the examiner should use language that focuses on those factors, reasons, and evidence that

lead the examiner to conclude that the specification fails to teach how to make and use the claimed invention without undue experimentation. (See MPEP 2164.04).

Applicants respectfully submit that one reasonably skilled in the art could make or use the invention from the disclosures in the present application without undue experimentation. Beginning on page 9, line 16 of the present application, the specification states that, prior to filling the chamber 50 with inflation fluid, the closure member 92 is a flat disk spaced from the rim 114 of the support 100. During subsequent loading of the closure member 92 by the pressure of the inflation fluid, the closure member is stressed and undergoes plastic deformation into the chamber 110. The inflation fluid exerts a force on the closure member 92 in a direction generally to the left as viewed in Figs. 3 and 4. The closure member deforms from the flat disk shown in Fig. 4 to the shape shown in Fig. 3.

As stated beginning on page 10, line 3, the initiator 98, when actuated, produces a shock wave and combustion gas. The pressure of the combustion gas, coupled with the shock wave, acts on the dome-shaped portion 122 of the closure member 92. Clearly, the support 100 directs the combustion gas and the shock wave to act only on the dome-shaped portion 122. Thus, upon actuation of the initiator 98, the combustion gas and shock wave exert a force on the dome-shaped portion 122 in a direction generally to the right as viewed in Fig. 3. Meanwhile, the inflation fluid continues to exert a force on the closure member 92 in a direction

generally to the left as viewed in Fig. 3. Under the force exerted by the combustion gas and the shock wave, the force exerted on the dome-shaped portion 122 by the inflation fluid is overcome and the dome-shaped portion is reversed to the position of Fig. 5.

As a result, a net force acts on the dome-shaped portion 122 to urge the dome-shaped portion in a direction generally to the right as viewed in Fig. 5. The force of the inflation fluid acting on the portion 124 is not opposed by the combustion gasses and the shock wave and is therefore urged generally to the left as viewed in Fig. 5. The dome-shaped portion 122 is thus urged generally to the right as viewed in Fig 5 under the force of the combustion gasses and shock wave produced by the initiator, whereas the portion 124 is urged generally to the left as viewed in Fig. 5 under the force exerted by the inflation fluid.

These opposite forces, acting on the dome-shaped portion 122 and the portion 124, respectively, of the closure member 92 create a shearing force between the dome-shaped portion 122 and the portion 124. The closure member 92 is thus sheared at the boundary between the dome-shaped portion 122 and the portion 124. This is exactly what one having ordinary skill in the art would expect based on the teachings of the specification. One having ordinary skill in the art would not expect the dome-shaped portion 122 to burst because the inflation fluid opposes the force of the combustion gasses and the shock wave along the dome-shaped portion.

For the reasons stated above, Applicants respectfully submit that the present application teaches to one having ordinary skill in the art why the dome-shaped portion 122 of the closure member is sheared away from the portion 124. Therefore, Applicants respectfully submit that the rejection of claims 1-17 based on 35 U.S.C. 112, first paragraph are improper.

In the Office Action of December 19, 2000, claim 21 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, it was unclear as to how the initiator causes the support to collapse and how the closure member ruptures under the force of inflation fluid. By the present amendment, claim 21 has been amended to more clearly recite the function of the support and how the closure member is ruptured.

In the Office Action of November 22, 2000, claims 18-20, and 22 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,145,876, issued to Hamilton.

As amended, claim 18 recites an apparatus for helping to protect an occupant of a vehicle that has a side structure. The apparatus comprises an inflatable vehicle occupant protection device that is inflatable into a position between the side structure of the vehicle and a vehicle occupant and an inflator for inflating the inflatable vehicle occupant protection device. The inflator maintains the inflatable vehicle occupant protection device in an inflated condition

for at least seven seconds. The inflator consists essentially of a stored inflation fluid under pressure. The inflation fluid consists essentially of helium.

The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials and those that do not materially affect the basic and novel characteristics of the claimed invention. *In re Herz* (emphasis in original, See MPEP 2111.03). Therefore, claim 18 is limited to a single type of inflation fluid, i.e., a stored inflation fluid under pressure, wherein the inflation fluid is helium.

Hamilton teaches an inflator system with a stored gas for supplementing inflation. The inflator system 130 includes a pyrotechnic inflator 138 and a supplemental gas assembly 170 that contains a stored gas under pressure. (See column 16, line 53 through column 17, line 7). When activated, the supplemental gas assembly 170 supplies supplemental gas to the inflatable 134 in a manner, or at a rate, that maintains the volume of gasses in the inflatable for a longer period of time. (See column 17, lines 7-12).

Hamilton is clearly directed towards supplementing a pyrotechnic inflator with a stored gas inflator in order to maintain inflation of the inflatable for an extended period of time. As stated above, claim 18 recites a stored helium inflator as the sole inflation means for inflating the inflatable vehicle occupant protection device and maintaining the device in an inflated condition for at least seven

seconds. Hamilton does not teach or suggest such an inflation fluid source.

For the reasons stated above, Applicants respectfully submit that claim 18, as amended, is allowable. Claims 19-21, depending from claim 18, are thus allowable as being dependent on an allowable claim and also for the specific reasons recited therein.

In the Office Action of November 22, 2000, claims 1, 3-10, and 12-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 3,648,898 issued to Day in view of U.S. Patent No. 5,564,740, issued to Zakula.

Claims 1 and 10, as amended, recite an apparatus including a container storing inflation fluid under pressure. The container has an outlet passage through which inflation fluid flows from the container. A rupturable closure member is fixed to the container and blocks flow of inflation fluid through the passage. A support for the rupturable closure member defines a chamber adjacent the rupturable closure member. The rupturable closure member has a first portion deformed into the chamber by the pressure of the inflation fluid and a second ring-shaped portion encircling the first portion outside of said chamber. The apparatus also includes an initiator that, when actuated, ruptures the closure member by shearing the first portion from the second portion.

Applicants respectfully submit that the prior art references of Day and Zakula do not teach or suggest all of the elements of claims 1 and 10. In particular, neither Day nor Zakula teach a first portion deformed into a chamber,

defined by a support for the closure member, under the pressure of inflation fluid and a second ring-shaped portion encircling the first portion outside of the chamber, wherein the first portion is sheared away from the second portion upon actuation of an initiator.

Day does not teach or suggest a first portion deformed into a chamber under the pressure of inflation fluid. Nowhere in Day is it taught or suggested that the dome-shaped portion of the burst disk 16 is deformed under the pressure of inflation fluid. Also, Day does not teach or suggest that the first portion is sheared away from the second portion upon actuation of an initiator. The diaphragm 16 is ruptured by a pointed pin 34. (See column 1, lines 74-75 and column 2, lines 73-75). Clearly, one skilled in the art would recognize that the pin 34, having a pointed configuration, would not shear the domed portion from the peripheral flange. Rather, the pointed pin 34 would pierce the domed portion.

In Zakula, a burst disk 16 is ruptured by a striker 20 movable upon pointed pin 34. (See column 5, lines 40-62). The striker 20 removes a portion of the burst disk 16 at or near the center of the disk. The removed portion includes the intersection of score lines 132-138 in the burst disk 16 and portions of the score lines. The burst disk 16 ruptures along the score lines 132-138 as intended. (See column 5, lines 49-62). Zakula does not teach or suggest that the dome-shaped portion of the diaphragm 16 is sheared from the portion of the diaphragm surrounding the dome-shaped portion. As clearly illustrated in Zakula, the striker 20 removes only

a portion of the dome-shaped portion of the diaphragm, leaving a major portion of the dome-shaped portion in tact.

With respect to claims 7 and 15, neither Day nor Zakula teach or suggest that the closure member is plastically deformed into the chamber by the pressure of the inflation fluid and work hardened due to plastic deformation. Applicants respectfully submit that this is not inherent in the Day or Zakula references because the deformation of the closure member under the pressure of the inflation fluid is not taught or suggested in Day or Zakula.

With respect to claims 8 and 16, neither day or Zakula teach or suggest a third portion encircling the second portion and a weld connection between the third portion and the container.

With respect to new claims 24 and 29, neither Day nor Zakula teach that the initiator, upon actuation, produces gasses and a shock wave that act on a first portion to shear a first portion from a second portion.

With respect to new claims 25 and 30, neither Day nor Zakula teach combustion gasses and a shock wave that act on a dome-shaped first portion to reverse the dome-shaped first portion and shear the first portion from a second portion.

For the reasons stated above, Applicants respectfully submit that claims 1 and 10, as amended, are allowable. Claims 2-9 and 23-27, depending from claim 1, and claims 11-17, and 28-30, depending from claim 10, are thus allowable as being dependent on an allowable claim and also for the specific reasons recited therein.

In the Office Action of November 22, 2000, claims 2 and 11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Day in view Zakula, and in further view of U.S. Patent No. 6,010,153, issued to Halas et al.

Claims 2 and 11, depend from claims 1 and 10, respectively, and recite that the closure member comprises a flat disk spaced a predetermined distance from an open first end of the support prior to said inflation fluid being introduced into the container. As stated above, claims 2 and 11 are allowable as depending from allowable claims.

By way of further argument, while Halas et al. does mention that the rupture disk is plastically deformable by pressure exerted on it by the stored gas, Halas et al. does not teach that the closure member is a flat disk prior spaced a predetermined distance from an open first end of the support prior to said inflation fluid being introduced into the container. As clearly illustrated in Halas et al., the domed portion of the closure member 62 is spaced from the portions 76 of the diffuser 70 where the closure member is welded 64. If the domed portion were formed by the pressure of the gas in the chamber 14, the domed portion would clearly extend from the portions 76 across the entire diffuser. Thus, the domed portion is clearly not formed in the closure member 62 not by inflation fluid pressure, because the illustrated shape of the closure member 62 is inconsistent with being shaped by the pressure of inflation fluid.

In the Office Action of November 22, 2000, claim 17 was rejected under 35 U.S.C. 103(a) as being unpatentable over

Day in view of Zakula, and in further view of U.S. Patent No. 6,056,316, issued to Yamaji et al. As stated above, claim 17 depends from claim 10 and is therefore allowable as depending from an allowable claim.

In the Office Action of November 22, 2000, claim 21 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton in view of Day. As stated above, claim 21 depends from claim 18 and is therefore allowable as depending from an allowable claim.

New claim 31 recites an apparatus for providing inflation fluid to inflate an inflatable vehicle occupant protection device. The apparatus comprises a container storing inflation fluid under pressure. The container has an outlet passage through which inflation fluid flows from the container. A rupturable closure member is fixed to the container. A support for the rupturable closure member defines a chamber adjacent the rupturable closure member. The rupturable closure member has a dome-shaped first portion deformed into the chamber by the pressure of the inflation fluid and a ring-shaped second portion encircling the first portion outside of the chamber. The second portion blocks flow of the inflation fluid through the passage. An initiator, when actuated, produces combustion gasses and a shock wave. The combustion gasses and the shock wave act on the first portion to shear the first portion from the second portion. The inflation fluid acts on the second portion to cause the second portion to petal away from the support and open the passage to provide a flow of the inflation fluid

from the container through the passage when the first portion is sheared from the second portion.

Applicants respectfully submit that none of the prior art references cited in the Official Action of November 22, 2000 teach or suggest all of the elements recited in new claim 31. The prior art references do not teach or suggest a support for the rupturable closure member that defines a chamber adjacent the rupturable closure member, wherein the rupturable closure member has a dome-shaped first portion deformed into the chamber by the pressure of the inflation fluid and a ring-shaped second portion encircling the first portion outside of the chamber. The prior art references also do not teach or suggest an initiator that, when actuated, produces combustion gasses and a shock wave, wherein the combustion gasses and the shock wave act on the first portion to shear the first portion from the second portion. Finally, the prior art references do not teach or suggest that the inflation fluid acts on the second portion to cause the second portion to petal away from the support and open the passage to provide a flow of the inflation fluid from the container through the passage when the first portion is sheared from the second portion.

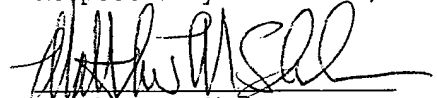
Attached is a marked-up version of the amended claims presented in this Amendment. The attached page is captioned **"Version With Markings To Show Changes Made."**

In view of the foregoing, it is respectfully submitted that the above identified application is in condition for

allowance, and allowance of the above-identified application is respectfully requested.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

On page 1, line 1, please replace the title of the invention with the following:

INFLATOR FOR INFLATABLE VEHICLE OCCUPANT PROTECTION
DEVICE

On page 6, please replace the paragraph beginning on line 3 with the following paragraph:

The main body portion 32 of the container 30 has a tubular, cylindrical configuration including an axially extending cylindrical side wall 40. The side wall 40 has a cylindrical inner surface 42 centered on a longitudinal central axis 44 of the inflator 22. A second end portion 46 of the main body portion 32 is closed by a domed end wall 48. The side wall [44] 40 and the end wall 48 define a chamber 50 in the container 30.

IN THE CLAIMS:

Please cancel claim 22 and amend claims 1, 7, 9, 10, 15, 18 and 21 as follows:

1. (Amended) An apparatus for providing inflation fluid to inflate an inflatable vehicle occupant protection device, said apparatus comprising:

a container storing inflation fluid under pressure, said container having an outlet passage through which inflation fluid flows from said container;

a rupturable closure member fixed to said container and blocking flow of inflation fluid through said passage;

a support for said rupturable closure member defining a chamber adjacent said rupturable closure member; said rupturable closure member having a first portion deformed into said chamber by the pressure of the inflation fluid and a second ring-shaped portion encircling said first portion outside of said chamber; and

an initiator which, when actuated, ruptures said closure member by shearing said first portion from said second portion.

7. (Amended) An apparatus as defined in claim 1 wherein said rupturable closure member is plastically deformed into said chamber by the pressure of the inflation fluid and is work hardened due to the plastic deformation.

9. (Amended) An apparatus as defined in claim 1 wherein said open first end of said support includes a circular rim defining an opening into said chamber, said rim having a surface engaging said ~~disk~~ closure member.

10. (Amended) An apparatus comprising:

an inflatable vehicle occupant protection device for inflation between a vehicle occupant and a side structure of the vehicle;

a container storing inflation fluid under pressure for inflating said inflatable vehicle occupant protection device, said container having an outlet passage

through which inflation fluid flows from said container toward said vehicle occupant protection device;

a rupturable closure member fixed to said container and blocking flow of inflation fluid through said passage;

a support for said rupturable closure member defining a chamber adjacent said rupturable closure member, said rupturable closure member having a first portion deformed into said chamber by the pressure of the inflation fluid and a second ring-shaped portion encircling said first portion outside of said chamber; and

an initiator which, when actuated, ruptures said closure member by shearing said first portion from said ring-shaped portion.

15. (Amended) An apparatus as defined in claim 10 wherein said rupturable closure member is plastically deformed into said chamber by the pressure of the inflation fluid and is work hardened due to the plastic deformation.

18. (Amended) An apparatus for helping to protect an occupant of a vehicle that has a side structure, said apparatus comprising:

an inflatable vehicle occupant protection device that is inflatable into a position between the side structure of the vehicle and a vehicle occupant; and

an inflator for inflating said inflatable vehicle occupant protection device and for maintaining said

inflatable vehicle occupant protection device in an inflated condition for at least seven seconds, said inflator ~~containing~~ consisting essentially of a stored inflation fluid under pressure, said inflation fluid consisting essentially of helium.


21. (Amended) Apparatus as defined in claim 20, further comprising a support for supporting said closure member against the pressure of said inflation fluid in said container, said initiator, when actuated, causing said ~~support to collapse, said closure member to rupture rupturing~~ under the pressure of said inflation fluid and opening said passage to provide a flow of inflation fluid from said container through said passage.

- (b) ☐ The undersigned hereby certifies that no item of information contained in this Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the undersigned's knowledge after making reasonable inquiry no item of information contained in the Statement, was known to any individual designated in 37 CFR \$1.56(c) more than three months prior to the filing of this Statement.
5. The Commissioner is hereby authorized to charge any additional fees, fees underpaid, or credit any overpayment with regard to this Statement to Deposit Account No. 20-0090.
6. Concise Explanation (if needed):
- (1) ☐ Below is a Concise Statement of Relevance of enclosed non-English language document(s).

U.S. PATENT DOCUMENTS

U.S. Patent No. 5,031,932	Discloses a single pyrotechnic hybrid inflator.
U.S. Patent No. 3,806,153	Discloses a safety bag inflation for vehicles.

Respectfully submitted,


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